4. Claims:

Claim 1

A mesh generation system for generating a mesh used for finite element analysis comprising:

a mesh characteristic extraction unit for receiving a conventional mesh and extracting a characteristic therefrom; and

a mesh generator for receiving a target shape model for mesh generation, and for generating a mesh for said shape model based on said characteristic of said conventional mesh extracted by said mesh characteristic extraction unit.

Claim 2

The mesh generation system according to claim 1, wherein said mesh characteristic extraction unit extracts said characteristic of said conventional mesh based on the geometrical characteristic of the elements of said conventional mesh.

Claim 3

The mesh generation system according to claim 1, wherein said mesh characteristic extraction unit extracts said characteristic as a tensor field.

Claim 4

The mesh generation system according to claim 1, further comprising:

a mesh characteristic changing unit for changing said characteristic of said conventional mesh extracted by said mesh characteristic extraction unit,

wherein said mesh generator generates a mesh based on said characteristic of said mesh changed by said mesh

characteristic changing unit.

Claim 5

The mesh generation system according to claim 3, further comprising:

a tensor field synthesization unit for synthesizing tensor fields describing multiple mesh characteristics extracted by said mesh characteristic extraction unit,

wherein said mesh generator generates a mesh by using the tensor field obtained by said tensor field synthesization unit.

Claim 6

The mesh generation system according to claim 3, further comprising:

a tensor field extrapolation unit, for receiving a shape model for mesh generation and for extrapolating said tensor field that is extracted by said mesh characteristic extraction unit and that indicates said characteristic of said conventional mesh, so that said tensor field matches said shape model,

wherein said mesh generator generates a mesh by using said tensor field obtained by said tensor field extrapolation unit.

Claim 7

A design support system, for using a computer to support design, comprising:

shape model preparation means for preparing a shape model;

mesh generation means for employing a predetermined mesh as a sample for the generation of a mesh for said shape model;

finite element analysis means for performing finite element analysis based on said mesh; and

analysis result output means for displaying the analysis results on a display device.

Claim 8

The design support system according to claim 7, wherein said mesh generation means extracts the characteristic of said predetermined mesh as a tensor field, and employs said characteristic to generate a mesh for said shape model.

Claim 9

An analysis system, for performing finite element analysis of a predetermined shape model, comprising:

mesh generation means for generating a mesh for a target shape model based on the characteristic of a predetermined mesh consonant with an analysis purpose; and

finite element analysis means for performing a finite element analysis based on said obtained mesh.

Claim 10

The analysis system according to claim 9, wherein said mesh generation means generates a mesh for said shape model based on said mesh characteristic represented as said tensor field.

Claim 11

An analysis method for analyzing a characteristic of a predetermined mesh using a computer comprising the step of:

receiving a mesh to be analyzed;

extracting the characteristic of said mesh as a tensor field; and

outputting said characteristic of said mesh.

Claim 12

The analysis method according to claim 11, wherein said step of extracting said characteristic of said mesh includes the steps of:

calculating an inertia tensor for each of the elements of said mesh; and

calculating an overall tensor field for said mesh based on said inertia tensor obtained for each of said elements.

Claim 13

An analysis method for analyzing a characteristic of a predetermined mesh using a computer comprises the step of:

extracting a characteristic of an analysis target mesh as a tensor field.

Claim 14

A mesh generation method for generating a mesh used for finite element analysis comprising the steps of:

extracting a characteristic from a conventional mesh; and

generating a mesh for a predetermined shape model based on the extracted characteristic.

Claim 15

The mesh generation method according to claim 14, wherein said step of extracting said characteristic includes the steps of:

calculating the size of each of said elements of said conventional mesh; and

employing the size of each of said elements to calculate a field describing said characteristic of said conventional mesh and corresponding to said overall conventional mesh.

Claim 16

The mesh generation method according to claim 14, wherein said step of extracting said characteristic may include the steps of:

calculating not only the sizes of said elements of said conventional mesh, but also, for each of said elements, the direction of flow, and the size and the aspect ratio of an ellipse or of an ellipsoid, which are defined based on said elements; and

employing said direction of flow, and said size and said aspect ratio of said ellipse or said ellipsoid to calculate a field describing said characteristic of said conventional mesh and corresponding to the overall conventional mesh.

Claim 17

The mesh generation method according to claim 14, wherein said step of extracting said characteristic includes the steps of:

calculating an inertia tensor for each of said elements of said conventional mesh;

calculating a tensor field, based on said inertia tensor obtained for each of said elements, for said overall conventional mesh; and

extrapolating said obtained tensor field, so that for mesh generation said tensor field matches said shape

model.

Claim 18

The mesh generation method according to claim 14, wherein said step of extracting said characteristic includes the steps of:

calculating an inertia tensor for each of said elements of said conventional mesh; and

employing said inertia tensor for each of said elements to directly calculate a tensor field that is extrapolated for the entire shape model.

Claim 19

A storage medium wherein input means of a computer stores a computer-readable program, which permits said computer to perform:

a process for extracting from a predetermined mesh a characteristic that matches the purpose of finite element analysis; and

a process for generating for a predetermined shape model a mesh based on the characteristic extracted from said predetermined mesh.

Claim 20

The storage medium according to claim 19, wherein said program also permits said computer to perform:

a process for calculating a tensor field defined based on said elements of said predetermined mesh in order to extract said characteristic.

Claim 21

A program transmission apparatus comprising:

storage means, for storing a program that permits a

computer to perform

a process for extracting from a predetermined mesh a characteristic that matches the purpose of finite element analysis, and

a process for generating for a predetermined shape model a mesh based on the characteristic extracted from said predetermined mesh; and

transmission means, for reading said program from said storage means and transmitting said program.

Claim 22

The program transmission apparatus according to claim 21, wherein said program also permits said computer to perform:

a process for calculating a tensor field defined based on said elements of said predetermined mesh in order to extract said characteristic.